OrbLink – Business Plan

Executive Summary 1

As the rate of satellites entering LEO accelerates at an unprecedented rate, efficient communication between satellites is a rising operational challenge. Heavy reliance on ground stations results in limited coverage windows for satellite communication, causing high latency whilst being extremely costly to set up.

This proposal presents a Software as a Service (SaaS) that uses AI based orbital tracking mechanics to evaluate the most efficient methods to plan out the logistical task of setting up the orbital placement and trajectory of future satellites. The system increases network efficiency and aims to reduce the required number of satellites and ground stations to reduce construction costs and minimise latency in data transfer by reducing downtime and improving global connectivity.

By using orbital predictive modelling and real time orbital and weather data, this solution will enhance the performance, efficiency and economic scalability of the LEO region as an future frontier for satellite networks. This foundation will pave the way to future sustainable and interconnected orbital infrastructure.

The Problem at Hand 2

Limitations of the Current Ground-Station Reliant System 2.1

Current estimates suggest that the number of satellites in LEO will exceed 60 000 by 2030, causing a large increase in communication congestion between ground based relay stations. This eventual bottleneck of data traffic will cause:

- High latency when routing data between ground stations
- Increased operational costs to construct and maintain a growing number of ground stations (Estimated $1 – 5 million per station)
- Redundancy of satellite launches being performed due to poor planning

As civilisation develops into the LEO frontier, the importance of rapid communication and data transfer between satellites is ever growing. The need for satellite-to-satellite communication is apparent to prevent the rise of inefficient communication logistics, wasted expenses and overpopulating the LEO region.

Why True Satellite-to-Satellite Connection Has Not Been Achieved 2.2

Satellites travel at approximately 7.5 km/s which requires extremely precise laser crosslinks with added mass and costs. As innovation in stable crosslinks advances, the issue at hand is making it commercially viable for any and every satellite.

- No frequency allocation for intersatellite communication
- Lack of a universal communication standard between constellations (e.g. Starlink and OneWeb use their proprietary standards)

- Direct links raise concerns about cyber security, data interception and encryption
- High cost of crosslink hardware resulting in short-term benefits for businesses to continue reliance on ground stations

A scalable, predictive planning and logistical system is required to be the backbone of planning for efficient development of the LEO frontier to prevent overpopulating the space and resulting in excess debris.

Proposed Solution 3

A Satellite Crosslink Optimisation Software is an SaaS that utilizes LEO object detection and path tracking via orbital mechanics to maximise efficiency for commercially available, universal inter-satellite communication.

Core Functionality 3.1

Creates a model for Link performance, calculated by the Friss transmission equation while accounting for atmospheric attenuation and solar radio emission. It also uses real-time data to simulate the effects of the weather and orbital geometry between satellites and ground stations.

Decision Making & Cost Modelling Tools 3.2

Performs calculations to inform clients on their saving projections and advises said clients on the most efficient way to organise their satellites and ground bases based on location and trajectories.

Key Benefits 3.3

- Latency reduced by at least 90% using inter-satellite communication
- Accurately predicts real world conditions to reduce hardware expenses
- Accessible to allow for smaller businesses and start-ups to utilise software

This software utilises publicly available NASA data to optimise future trajectory changes for satellites whilst maintaining debris avoidance. Furthermore it also takes into account of the weather data provided by NASA to optimise ground to satellite connections.

Market Opportunity 4

Global Satellite Communication Market Value (2024): ~$84 billion

Projected Satellite Communication Market Value (2024): ~$120 billion (CAGR 6.5%)

Active Satellites by 2030: >12 000

Estimated Active satellites by 2035: ~60 000 (ESA)

Targeting all companies that wish to make use of satellite communications in LEO. First target customers include proprietary services such as Starlink & OneWeb followed by national space agencies (government organisations). The market will then become more accessible to independent research organisations as laws are put

in place. The final goal is to be hold the universal standard used by all research firms for inter-satellite communications.

Strategy & Revenue 5

Perform a strategic roll out over 2 years by creating fundamental prototypes and gaining 2 – 3 operators as initial clients.

Perform pilot integration to allow for testing with smaller integrations to improve the accuracy and perform iterative testing to improve the precision and practical accuracy of the SaaS.

Deploy it to the masses using subscription fees and expand into consultancy services.

Sustainability & Environmental Responsibility 6

Our goals and aims are to:

- Minimise redundant satellite launches to prevent overpopulating LEO region
- Encourage different organisations to use all satellites to improve and "piggy back" communication to allow for the faster transfer of information
- Lowering orbital congestion by reducing sources of debris by optimising satellite pathing

Aim to reduce debris production by hundreds of tonnes annually.

Scalability 7

- SaaS structure allows for international simultaneous communication for a large array of clients
- Expand orbital datasets to improve satellite and debris tracking, hence improving the safety of LEO travel and improving models
- Scale up from small constellations (~ a dozen satellites) to mega constellations using thousands
- Work on more advanced, higher range communications such as medium & high earth orbit
- Extrapolate services into relay networks for deep space exploration

Conclusion 8

Our business proposes a solution to one of the largest obstacles to fully utilising the LEO frontier: fast, efficient intersatellite communication. By enabling crosslink networking, it improves the long term stability of the developing infrastructure and helps maintain the sustainability of the LEO ecosystem. Our business aims to lay the foundation for a sustainable and stable infrastructure in an efficient, intelligent and cooperative frontier of space.